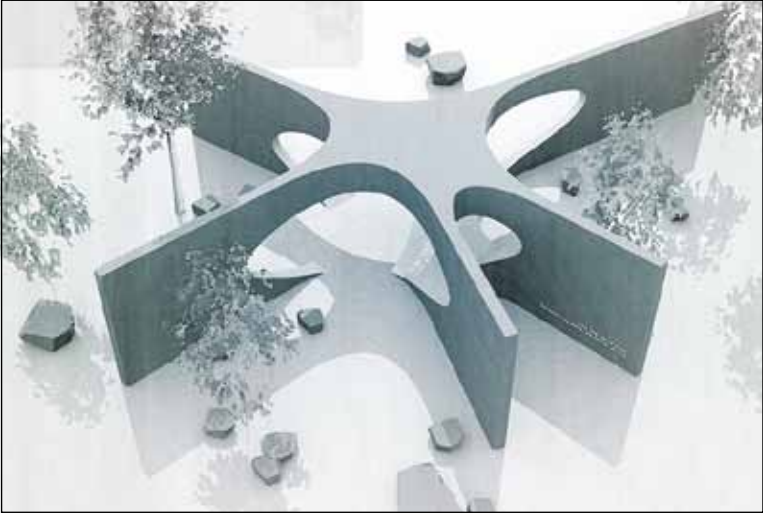


# Prof. unveils design for new tribute to Officer Sean Collier

*Cost of permanent structure by Stata is still uncertain*



A rendering of the planned memorial to the late MIT Police Officer Sean Collier. The memorial will stand between the Stata Center (Building 32) and the Koch Institute for Integrative Cancer Research (Building 76), near where Collier was shot.

By Kath Xu  
NEWS EDITOR

A year after MIT Police Officer Sean Collier was allegedly shot and killed by the Boston Marathon bombing suspects, MIT unveiled its plans for a permanent memorial to him. Architecture Professor J. Meejin Yoon revealed her design at last Friday's ceremony of remembrance for Collier.

"The memorial is inspired by the gesture of an open hand," said Yoon in an interview with *The Tech*. In the design, five solid walls of granite enclose a space at the center. According to Eric Höweler, Yoon's architectural collaborator, the goal is to open the memorial on the second anniversary of Collier's death: April 18, 2015.

Sean Collier, Page 14

## Second Phi Sig JudComm hearing followed failed alcohol inspections

MIT fraternity Phi Sigma Kappa faced its second hearing with the Judicial Committee (JudComm) of the Interfraternity Council this academic year after reportedly violating sanctions imposed in a hearing last fall, former JudComm Chair Evan Tencer '15 said in an interview with *The Tech*.

An 18-year-old member of Phi Sig fell four stories through a skylight on the roof of the fraternity's house during a party on Sept. 11, 2013, and sustained non-life-threatening injuries. Following the incident, the fraternity faced a JudComm hearing that was, according to current IFC President Haldun Anil '15 in an interview, "specifically related to the roof incident."

The decision made as a result of the hearing put the fraternity on organizational probation, which allowed the hearing board flexibility in specifically

addressing their case, according to Tencer. The hearing board placed sanctions on Phi Sig as part of their probation, which included being subject to a number of alcohol inspections.

Another hearing for Phi Sig was held in early March, however, after the fraternity failed two successive alcohol inspections in early December, Tencer said.

The original sanctions instituted after the first hearing mentioned that suspension of Phi Sig would be "seriously considered" should it fail one or more of its alcohol inspections. Due to extenuating circumstances, Tencer said, Phi Sig was not suspended after its second hearing and was rather kept on organizational probation.

The sanctions from the original hearing prohibited Phi Sig from having prefrash at their

Phi Sigma Kappa, Page 16

# Still no word on causes of 2 grad student deaths

*HST student Eliana Hechter remembered*

By Leon Lin  
NEWS EDITOR

MIT announced the death of Eliana F. Hechter, a first-year medical student at Harvard and MIT's joint Health Sciences and Technology program, last Friday.

A former Rhodes Scholar, Hechter held a doctoral degree in statistics from the University of Oxford, according to her CV.

"We encourage students, administra-



Eliana Hechter in 2012.

tion, and faculty to come together as a community to remember Eliana as a student with tremendous promise, and one who has been lost far too soon," a letter from several HST faculty and staff members read.

MIT did not say when or how she died. The causes of the deaths of both Hechter and Hadi Kasab, the MIT graduate student who was found dead in March, were still unannounced at press time.

A spokesman for the Massachusetts medical examiner said that Hechter's and Kasab's autopsies were still "pending."

A spokeswoman for the Middlesex district attorney said that neither case was "believed to be suspicious."

*The Daily Star*, a newspaper based in Beirut, reported in March that Kasab had been buried in his hometown of Kfar Shuba, Lebanon. Still, Terrel Harris, the spokesman for the medical examiner, said that Kasab's autopsy required "additional testing" that could take several more weeks.

The letter from the HST faculty and staff members said that those in need of support could turn to MIT Medical's mental health and counseling services, MIT's chaplains, or the graduate education dean's office.



Marathon and Collier memorial photos  
pages 10-11

## GSC group: make 'high-impact' Somerville shuttle permanent

*New route reaches graduate students living off campus*

By Weixuan Li

The Somerville Saferide Shuttle has proven to be a "high-impact line," according to a report from the Graduate Student Council Transportation Subcommittee, which assessed the Fall 2013 trial program of a new Saferide route in Somerville and East Cambridge.

The Somerville route is the first student-created, data-driven bus service design at MIT, according to Brian L. Spatocco G, the former chair of the subcommittee.

"We developed an algorithm using the graduate students' res-

idential data and optimized this shuttle route to provide the most services to the people who have the most need," Spatocco told *The Tech*. "By saying 'the most need,' I mean the thousands of students who live in the area with no alternative public transit or shuttle service available to get from campus in the evenings."

About two-thirds of graduate students live off campus, many of them in Cambridge, mostly close to the Somerville/Inman Square area, according to graduate student residential address data from the MIT Institutional Research section of the Office of the Provost, Spatocco said.

"We saw where people lived did not correspond to shuttle service plans," he said. Existing transit options — MBTA, MIT shuttles, EZRide — failed to "hit most of the major 'heat' blocks we observed from the data."

The GSC Transportation Subcommittee tried to tackle this problem in what was perhaps a typical MIT way: they developed an algorithm and wrote a bunch of scripts, seeking to maximize impact — to serve the most people who currently were not served. Then, they presented their solution to MIT and per-

Saferide, Page 16

### NEWS BRIEFS

#### MIT seeks better compliance with open-access policy

Since the implementation of the Institute's open-access policy in 2009, more than 11,000 articles have been posted on DSpace, MIT's online archive of research. These represent 37 percent of the total number of papers published by the MIT faculty in that period.

"That number is less than the

majority of papers — it may not sound impressive, but its actually among the highest of MIT's peers," said Faculty Chair Steven Hall, who reported on a five-year review of the policy at a faculty meeting on April 16.

The policy mandates that faculty members let MIT openly publish the "fruits of their research."

Hall hopes to form a committee in the fall that will consider what incentives MIT can offer to encourage authors to comply with the policy more often. The committee will also consider whether

to extend the policy to the thousands of postdoctoral researchers, and perhaps even MIT students.

#### G/H-level subject distinction to be eliminated

The faculty voted to remove all graduate degree requirements associated with H-level subjects at the faculty meeting on April 16.

G-level subjects are subjects approved for graduate credit, while H-level subjects are higher-level graduate subjects approved for a graduate degree, according

to MIT's 2012 Bulletin.

"In addition to being very unclear, it also leaves the department to decide what is appropriate for a degree... It led to confusion and inconsistency, and also unfair student treatment," said Professor Nicolas G. Hadjiconstantinou. According to Hadjiconstantinou, graduate departments and programs responded overwhelmingly in favor of eliminating the G/H distinction when asked for feedback during the evaluation process.

—Victoria Messuri

### IN SHORT

Get up close and personal with MIT's material consumption at the public waste audit today from 10 a.m. to 1 p.m. in front of W20 (the student center). Students and staff will be sorting through hundreds of kilograms of garbage.

The deadline for placing commencement regalia orders to the MIT COOP is Saturday, April 26.

Send news information and tips to news@tech.mit.edu.

### EARTH WEEK COMES TO MIT

Our Campus Life section looks into various green issues. **CAMPUS LIFE, p. 10**

### SUSTAINABLE CAMPUS

MIT Office of Sustainability works on a green campus. **CAMPUS LIFE, p. 12**

### MIT'S GREEN RESEARCH

A sampling of MIT's labs tackling global challenges. **CAMPUS LIFE, p. 10**



### SOLAR-POWERED ROAD TRIP

MIT Solar Electric Vehicle Team prepares for the American Solar Challenge. **CAMPUS LIFE, p. 10**

### THE BENEFITS OF COMPOSTING

Unlocking the true power of food waste, at MIT and beyond. **CAMPUS LIFE, p. 12**

### SECTIONS

World & Nation . . . 2  
Opinion . . . . . 4  
Fun Pages . . . . . 5  
Campus Life . . . 10  
Arts . . . . . 18  
Sports . . . . . 20

## U.N. finds humanitarian aid still blocked in Syria

Hundreds of thousands of Syrians have no access to medical supplies because the warring sides in the country's civil war are blocking humanitarian relief, according to a report from the United Nations secretary-general.

The Syrian government refused to let U.N. workers deliver medicine to Douma, a suburb of the capital, Damascus, in late March, and in early April injectable medicines were prevented from being delivered to another town, the report said. Children remained beyond the reach of health workers administering polio vaccines, it said, and two new cases were confirmed in April.

The report is part of the United Nations' second 30-day assessment of how the Syrian government and rebels fighting to overthrow it have complied with a Security Council resolution ordering them to allow humanitarian aid to enter besieged towns.

The report calls the denial of medical aid "arbitrary and unjustified, and a clear violation of international humanitarian law," and says 216,015 people lack access to medical supplies that have been blocked from entering towns or removed from convoys. It does not say by whom, but offers examples that point to government forces.

—Somini Sengupta, *The New York Times*

## An Ivy League newspaper may be going mostly online

NEW YORK — The battle over the future of newspapers has found an unlikely flash point, above a Pinkberry on the fringes of Columbia University's Manhattan campus.

There, on Wednesday night, in the offices of the university's student-run newspaper, the Columbia Daily Spectator, its editor announced a plan to stop printing daily and switch to a weekly edition beginning in the fall. The Spectator would be first Ivy League newspaper to make such a move.

The announcement has pitted a group of the paper's alumni who are angered by the decision against those who view the move as a necessary embrace of the digital age.

"I am quite simply appalled by the arrogant, presumptuous tone of the board members, and the staff, who want so blithely to dispense with more than a hundred years of tradition," John R. MacArthur, a trustee, the publisher of Harper's magazine and an evangelist for print, wrote in an email earlier this month.

Michael Ouimette, the publisher of the Spectator, a nonprofit that has operated independently of the university since 1962, responded that moving to a predominantly online publication would "enable us to concentrate on the quality of our stories and our digital future."

No formal decision has been made, said Wendy Brandes, the board's chairwoman, and it will most likely be put to a vote among the 11 alumni trustees.

—Ravi Somaiya and Sydney Ember, *The New York Times*

# Dual setbacks for Obama on a strategic Asian tour

By Mark Landler and Jodi Rudoren

THE NEW YORK TIMES

TOKYO — President Barack Obama encountered setbacks to two of his most cherished foreign-policy projects Thursday, as he failed to advance a trade deal that undergirds his strategic pivot to Asia and the Middle East peace process suffered a potentially irreparable breakdown.

Obama had hoped to use his visit here to announce an agreement under which Japan would open its markets in rice, beef, poultry and pork, a critical step toward the trade pact. But Prime Minister Shinzo Abe was not able to overcome entrenched resistance from Japan's farmers in time for the president's visit.

In Jerusalem, Israel's announcement that it was suspending stalemated peace negotiations with the Palestinians, after a rapprochement between the Palestine Liberation Organization and the militant group Hamas, posed yet another obstacle to restarting a troubled peace process in which Secretary of State John Kerry has been greatly invested.

The setbacks speak to the common challenge Obama has had in translating his ideas and ambitions into policies. He has watched outside forces unravel his best-laid plans, from resetting relations with Russia to managing the epochal political change in the Arab world.

In one sense, the latest grim news from the Middle East offers a rationale for Obama to keep his gaze

fixed on the fast-growing economies of Asia. While the troubles with the peace negotiations have surprised almost no one, the trade talks with Japan still hold some hope of yielding a landmark deal, since it is in the interests of both Abe and Obama — a bet on the future rather than an effort to clear the enmities of the past.

Frailties also were on display in Jerusalem, where Prime Minister Benjamin Netanyahu of Israel acted swiftly to suspend talks after his Palestinian counterpart, President Mahmoud Abbas, signed a deal seeking to reconcile his Fatah faction, which dominates the Palestine Liberation Organization and leads the West Bank government, with Hamas, the Islamist group that controls the Gaza Strip.

# Apple, Google, Intel, Adobe settle hiring collusion suit

By Nick Bilton

THE NEW YORK TIMES

SAN FRANCISCO — Four major Silicon Valley companies, including Apple and Google, settled a high-profile suit Thursday over charges that they conspired not to hire one another's workers, according to a court filing Thursday.

Technology employees filed a class-action lawsuit in 2011 against Apple, Google, Intel and Adobe, saying the tech companies violated federal antitrust laws by conspiring for several years to suppress the pay of

employees by agreeing to not poach employees from one another.

Terms of the settlement were not disclosed, but the plaintiffs had argued that the lost wages added up to \$3 billion. Three smaller settlements with other defendants, including Lucasfilm, Pixar and Intuit, were reached last year for \$20 million.

"This is an excellent resolution of the case that will benefit class members," Kelly M. Dermody, a lawyer with Loeff Cabraser Heimann & Bernstein, the defendants' legal team, said in a press release. "We look forward to presenting it to the Court

and making the terms available."

The lawsuit included 64,613 software engineers and accuses the companies of agreeing not to solicit one another's employees in a scheme developed and enforced by Steve Jobs, then chief executive of Apple. A trial was set to begin in May.

The lawsuit exposed emails between Jobs and Google executives discussing their agreement.

In one exchange, Jobs emailed Sergey Brin, co-founder of Google, "If you hire a single one of these people, that means war."



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# FCC could allow fast lane on web in net neutrality policy shift

By Edward Wyatt  
THE NEW YORK TIMES

WASHINGTON — The principle that all Internet content should be treated equally as it flows through cables and pipes to consumers looks all but dead.

The Federal Communications Commission said Wednesday that it would propose rules that allow companies like Disney, Google or Netflix to pay Internet service providers like Comcast and Verizon for special, faster lanes to send video and other content to their customers.

The proposed changes would affect what is known as net neutrality — the idea that no providers of legal Internet content should face discrimination in providing offerings to consumers and that users should have equal access to see any legal content they choose.

The proposal comes three months after a federal appeals court struck down, for the second time, agency rules intended to guarantee a free and open Internet.

FCC Chairman Tom Wheeler defended the agency’s plans late

Wednesday, saying speculation that the FCC was “gutting the open Internet rule” is “flat out wrong.” Rather, he said, the new rules would provide for net neutrality along the lines of the appeals court’s decision.

Still, the regulations could radically reshape how Internet content is delivered to consumers. For example, if a gaming company could not afford the fast track to players, customers could lose interest and its product could fail.

The rules could also raise prices as the likes of Disney and Netflix passed on to customers whatever they paid for the speedier lanes, which would be the digital equivalent of an uncongested car pool lane on a busy freeway.

Consumer groups attacked the proposal, saying that not only would costs rise but that big companies with the money to pay large fees to Internet service providers would be favored over startups with innovative business models — stifling the birth of the next Facebook or Twitter.

“If it goes forward, this capitulation will represent Washington at its worst,” said Todd O’Boyle, program

director of Common Cause’s Media and Democracy Reform Initiative. “Americans were promised, and deserve, an Internet that is free of toll roads, fast lanes and censorship — corporate or governmental.” If the new rules deliver anything less, he added, “that would be a betrayal.”

Wheeler rebuffed such criticism. “There is no ‘turnaround in policy,’ he said in a statement. “The same rules will apply to all Internet content. As with the original open Internet rules, and consistent with the court’s decision, behavior that harms consumers or competition will not be permitted.”

Broadband companies have pushed for the right to build special lanes. Verizon said during appeals court arguments that if it could make those kinds of deals, it would.

Under the proposal, broadband providers would have to disclose how they treated all Internet traffic and on what terms they offered more rapid lanes, and would be required to act “in a commercially reasonable manner,” agency officials said. That standard would be fleshed out as the agency seeks public comment.

## Amid gripes, France joins gay couples by the thousands

PARIS — Same-sex marriage has been gaining acceptance in France a year after a law allowing such unions was passed following vociferous public opposition and heated debate in Parliament.

More than 7,000 same-sex marriages were performed in 2013, according to recent figures from the National Institute of Statistics and Economic Studies.

Paris had the largest number of same-sex weddings — more than 1,000 — but ceremonies were also held in small villages and in large cities throughout the country. In total, same-sex marriages represented 3 percent of all weddings in 2013. Most of those unions were between middle-aged men.

Erwann Binet, a Socialist member of Parliament who presented the law at the National Assembly last year, called the change “considerable,” adding that the weddings of the past year had helped make same-sex marriage seem like a positive development to the French public.

The law was viewed as a significant victory for President François Hollande, whose declining support in public opinion polls had already begun.

Demonstrations against same-sex marriage, which sometimes turned violent, swept the country and were particularly vehement in the months before the law was implemented in May last year. Behind the opposition were conservative and religious leaders as well as some groups that simply opposed Hollande’s left-leaning government.

—Maïa De La Baume and Alissa J. Rubin, *The New York Times*

## Americans die in grim trend in Afghanistan

KABUL, Afghanistan — Three Americans were killed at a private hospital in Kabul on Thursday morning when an Afghan police officer turned his gun on them, officials said, in the latest in a string of attacks against Western civilians here.

After a campaign of Taliban violence aimed at foreigners raised apprehensions before the presidential election this month, the latest attack seemed to have nothing to do with the insurgency. Rather, officials said the gunman appeared to be a police officer who reacted in the moment when he saw a small group of U.S. visitors outside his guard post, raising fears of a new wave of so-called green-on-blue shootings spurred by deepening Afghan resentment.

The shooting took place at Cure International Hospital, which specializes in the treatment of disabled children and women’s health issues. Afghan police officials said that one of the doctors there was hosting visitors from the U.S. who, after taking pictures together in front of the hospital, were headed inside when they were attacked.

Among the dead was a pediatrician from Chicago, Dr. Jerry Umanos, who had volunteered at the Cure hospital for almost nine years, treating children and helping train Afghan doctors. There were few details about the other victims on Thursday night.

Afghan officials identified the gunman, who was wounded, as a two-year veteran of the Kabul police force named Ainuddin, who had only recently been assigned to guard the hospital. Witnesses and officials said he fired on the Americans as they approached his security post at the building’s entrance, killing three and wounding a female doctor before entering the interior courtyard and seeking new targets.

There were conflicting reports about whether other officers then shot him, or whether he turned his gun on himself. He was admitted at the Cure hospital as a patient.

Spokesmen for the Taliban, usually quick to claim responsibility for attacks on Westerners, did not assert any involvement this time. Instead, the details seemed to speak to a growing alienation between Afghans and Americans here, as uncertainty about the relationship between their countries has deepened as troops prepare to withdraw this year.

“The foreigners have been here too long,” said a man outside the hospital who gave his name as Fawad and said a female relative was in the Cure hospital undergoing surgery. “People are tired of them.”

—Azam Ahmed and Alan Blinder, *The New York Times*

# Panel recommends ditching plagued Oregon health exchange

By Robert Pear and Kirk Johnson  
THE NEW YORK TIMES

WASHINGTON — With encouragement from the Obama administration, an Oregon panel recommended Thursday that the state scrap the website for its beleaguered health insurance exchange and use the federal marketplace instead.

State officials concluded that it would be much less expensive to use the federal site, HealthCare.gov, than to repair the one built specially for the state, Cover Oregon. The first option would cost \$4 million to \$6 million, while the second would cost \$78 million, state officials said.

The Oregon exchange — like those in Hawaii, Maryland and Massachusetts — has been plagued with technical problems that have made it difficult for consumers to enroll online. All four states have Democratic governors who strongly sup-

port President Barack Obama’s effort to expand coverage under the 2010 health care law.

The exchange is a keystone of the health care law: a website where consumers can compare private health plans, enroll and obtain subsidies to help defray the cost. Three dozen states are using the federal exchange.

Greg Van Pelt, an adviser to Gov. John Kitzhaber of Oregon, told Congress this month that “the launch of the Affordable Care Act in Oregon has been bumpy,” and that “the website is only partially functioning.”

Aaron Albright, a spokesman for the federal Centers for Medicare and Medicaid Services, which runs HealthCare.gov, said Thursday, “We are working with Oregon to ensure that all Oregonians have access to quality, affordable health coverage in 2015.”

The board of the Oregon exchange plans to meet Friday and is expected to approve the recom-

mendation by its technology options work group.

Kitzhaber said he agreed with the panel’s advice. “I think their recommendation to use the federal website technology is the right call,” he said. “It is the most reliable and least costly way to ensure that we have a working website for the next enrollment period.”

For most states, the initial six-month enrollment period ended March 31. But the Obama administration allowed Oregon to extend the application period through April after Kitzhaber said that technology problems had “created delays, confusion, and frustration” for people trying to use the state exchange. The next open enrollment season is scheduled to start Nov. 15 and continue for three months.

Oregon has received \$305 million in federal grants to build its exchange, according to the Congressional Research Service.

### WEATHER

## Wind dies down before rainy weekend

By Ray Hua Wu  
STAFF METEOROLOGIST

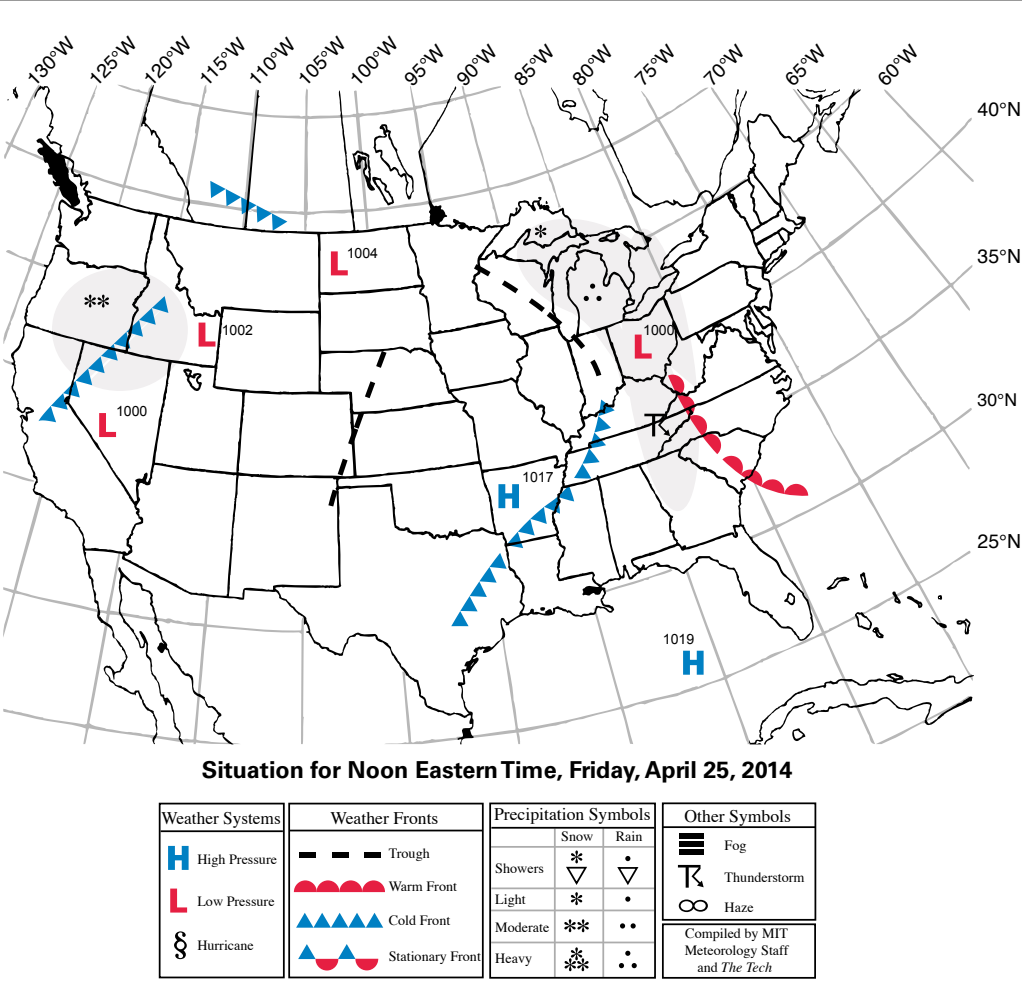
Though yesterday was notably windy, today will come to be a nice normal Spring day, with dispersed clouds. Afternoon temperature today should peak above 60 Fahrenheit.

Tomorrow, however, can be expected to be much different.

A deluge of rain is expected, possibly up to 1 to 2 inches. Temperature tomorrow is expected to be consistently in the lower 40s Fahrenheit, gradually decreasing. Over the rest of the weekend, expect clouds to persist, lows in the 40s, and highs in the 50s Fahrenheit. Another round of Spring showers are expected towards the end of next week.

### Extended Forecast

**Today:** Cloudy. High 64°F (18°C). Winds West at 15 mph.  
**Tonight:** Late night rain. Low 41°F (5°C). Winds North at 10 mph.  
**Tomorrow:** Large amounts of rain. High 43°F (6°C). Winds Northeast at 20-25 mph.  
**Sunday:** Cloudy. High 52°F (11°C). Winds North at 15 mph.  
**Monday:** Cloudy. High 56°F (13°C). Winds North at 11 mph.





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## OPINION POLICY

## TO REACH US

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# Sudoku I

Solution, page 16

				8	4	9		
8							3	6
	6	1	9		3			
			1	6			8	9
		9				1		
2	1			5	9			
			8		5	7	1	
1	2							8
		7	3	1				

# Sudoku II

Solution, page 16

6						3		
	3	2		5	8			4
			1				2	
8	2		4		6		9	
	9						6	
	4		8		7		1	3
	6				5			
3			2	8		6	4	
		9						1

Instructions: Fill in the grid so that each column, row, and 3 by 3 grid contains exactly one of each of the digits 1 through 9.

# Techdoku I

Solution, page 16

30x	48x			18x	
	10x		1		4
6x		60x		30x	1
	18x	7+			1-
			8x		
4		30x			2

# Techdoku II

Solution, page 16

17+			6x		2
4		144x			
18+		6x		30x	
			3		24x
2x			100x		
144x					1

Instructions: Fill in the grid so that each column and row contains exactly one of each of the numbers 1–6. Follow the mathematical operations for each box.

# Four-H Club

by Fred Piscop

Solution, page 15

### ACROSS

- 1 Back at the track  
6 Birth of a notion  
10 Casino fixtures  
14 Thrifty, in product names  
15 Birth of a notion  
16 Bygone monarch  
17 Investment in rocketry?  
19 Unfeigned  
20 “On the spot” spot  
21 Make evil  
23 Estimate follower  
25 Vanquished one  
26 Ebbs  
30 Fertilizer compound  
33 Middlemarch author  
34 Piece of flatware  
35 Piece of bakeware  
38 City near Chicago  
39 In a daze  
40 Dishonorable  
41 Chihuahua cheer  
42 Gargle, perhaps  
43 Calculus pioneer  
44 Remorseful feeling  
46 Put on the line  
47 Was in knots


- 49 Wallop  
51 Iris covers  
54 They’re waste-full  
59 Tinged  
60 New Jersey, vis-à-vis the original 13?  
62 Skin-care brand  
63 Welles portrayal  
64 Caper film activity  
65 At \_\_\_ (disagreeing)  
66 Underworld river  
67 Wallops
- DOWN**
- 1 One of the March sisters  
2 Chamber effect  
3 Trespassing, for instance  
4 Heavy weight  
5 Beat barely  
6 Pile at some parties  
7 www.mit.\_\_\_  
8 Tear apart  
9 Concocted  
10 Newest American Leaguers  
11 Spanker’s scolding?

- 12 Color close to lavender  
13 Unmitigated  
18 Camper’s buy  
22 Lay out  
24 Blocks  
26 Blocks name  
27 King David Lounges operator  
28 Akron blog’s thematic strand?  
29 Tofu base  
31 Move like mud  
32 Rubber mouse, perhaps  
34 get-music.net download  
36 Comment with a nod  
37 Uncool one  
39 Carry the day  
40 With 42 Down, commute for some  
42 See 40 Down  
43 Hat-size increments  
45 #3 in the burger biz  
46 Red herring  
47 Allergic reaction, maybe  
48 Was able to  
50 Glove material  
52 Calls upon


1	2	3	4	5		6	7	8	9		10	11	12	13	
14						15					16				
17					18						19				
20								21		22					
				23			24			25					
26	27	28	29				30	31	32						
33						34						35	36	37	
38					39						40				
41					42					43					
			44	45					46						
47	48							49	50						
51						52	53		54			55	56	57	58
59						60		61							
62						63					64				
65						66					67				

- 53 Photo finish  
55 Consider, with “on”  
56 “Summertime,” e.g.
- 57 Snug quarters  
58 Studio constructions  
61 Nonspecific amount





PILED HIGHER AND DEEPER



by Jorge Cham

SO MANY THINGS TO DO!

Aah!

SO LITTLE TIME TO DO THEM IN!

Aaah!

SO MANY E-MAILS TO WRITE BEFORE YOU CAN EVEN START!

Aaaah!

Inbox (21,993)

SO LITTLE MOTIVATION TO DO ANY OF IT.

I'm just going to eat this chocolate.

SO TYPICAL.

WWW.PHDCOMICS.COM

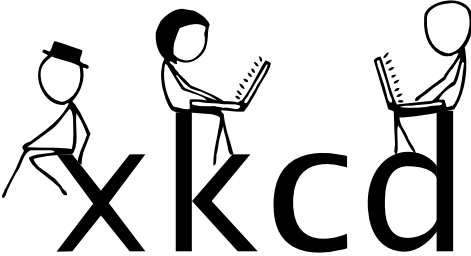
HOW MY WEEK WENT:

AMOUNT OF TIME I SPENT BEING PRODUCTIVE

AMOUNT OF TIME I SPENT DOING THINGS I THOUGHT WOULD MAKE ME MORE PRODUCTIVE.

WWW.PHDCOMICS.COM

[1355] Airplane Message



A WEBCOMIC OF ROMANCE, SARCASM, MATH, AND LANGUAGE

by Randall Munroe

MY HOBBY:  
BREAKING INTO AIRPLANE HANGARS AND REPLACING THE ADS ON THEIR GIANT BANNERS WITH COOL FACTS

PHARAHOH IRY-HOR, FROM THE 3100s BC, IS THE FIRST HUMAN WHOSE NAME WE KNOW

Saturday Stumper by Doug Peterson

Solution, page 15

ACROSS

- 1 Show of hands?
- 9 Monster High creator
- 15 "Totally"
- 16 Way to stand
- 17 Private instructor, at times
- 18 They're found in bands
- 19 Dam, e.g.
- 20 Pops
- 21 "We \_\_ put into this world to sit still": Woodrow Wilson
- 22 Apple Store tech-support station
- 25 USA, for one
- 28 Drift
- 29 Ivanhoe's jester, e.g.
- 33 Calls for
- 35 Makeup-table bottle
- 37 Island east of Valencia
- 38 Brown \_\_
- 39 Dispatch
- 40 Film star turning 60 this year
- 42 Put on a show

- 43 General Motors division
- 44 In unfamiliar territory
- 46 Duo of old
- 47 Buy for a bender
- 50 Mexican underworld boss?
- 53 Stranded carrier
- 54 Weekly opening
- 57 City in northern Spain
- 58 Steals away
- 60 Idylls of the King character
- 61 Filing service
- 62 Roll players
- 63 Perks in the air

DOWN

- 1 Text attachments
- 2 Rats' relative
- 3 It may mean "Senior"
- 4 Drivel
- 5 Blow away, say
- 6 Fire-breathers
- 7 One in a tour group
- 8 Name on the 1956 Best Actor Oscar
- 9 Lovecraftian

- 10 Inspiration for Ingmar and Francis Ford
- 11 Australian predators
- 12 IRS badge holder
- 13 Spanish Civil War battle site
- 14 In unfamiliar territory
- 22 Image on Alaska's state quarter
- 23 Let go
- 24 Walk-on part?
- 25 Mate
- 26 Swing descendant
- 27 Miss in the past
- 30 County north of the Thames
- 31 Do another hitch
- 32 Feels discontent
- 34 Laotian's language family
- 36 Nod accompanier
- 38 L. Louise locale
- 41 Divers' haunts
- 42 Spreading (out)
- 45 Winter warmer
- 48 Out number

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- 49 Its snout doubles as a snorkel
- 50 \_\_ age
- 51 He had St. Basil's built
- 52 Bygone audio brand
- 54 Sort of digital
- 55 Out of line
- 56 "No kidding?"
- 58 Laura Bush alma mater
- 59 Place that sells face masks



# Boston Marathon



JESSICA L. WASS—THE TECH



HO YIN AU—THE TECH



MELISSA RENÉE SCHUMACHER—THE TECH



JESSICA L. WASS—THE TECH

- 1. MIT Strong Boston Marathon team member Thomas Brand shortly after the 10K checkpoint in Framingham.** The MIT Strong team ran the Boston Marathon on Monday in honor of MIT Police Officer Sean A. Collier, who died one year ago.
- 2. There was a heavy police presence at the Boston Marathon this year.** Security checkpoints to get near the finish line were established, and many roads were blocked with police barriers and public works trucks.
- 3. A "Prayer Canvas" was laid out in Boston Common, decorated with messages of hope, solidarity, and love for Boston during the marathon.** Markers were provided so that anyone could add to the canvas.
- 4. One of one hundred runners selected of the nearly three hundred who applied for Team MR8,** the team established by the Martin W. Richard Charitable Foundation, runs the final stretch of Commonwealth Ave. before turning onto Boylston Street and crossing the finish line. The foundation and the team were established by the parents of Martin Richard, the young boy who was killed in the bombings last April.
- 5. Emotions were high at the finish line of the 118th running of the Boston Marathon on Monday.**



CHRISTOPHER A. MAYNOR—THE TECH





**1. Thousands of paper cranes adorned the Stata Center's Gates Atrium in remembrance of Sean Collier last Friday, April 18.** Hackers collected, strung, and glued cranes from students, faculty, alumni, and friends throughout the Greater Boston area, and installed the hack overnight.

**2. Dan Oliver, a member of the MIT Strong marathon team, unveiled signs that mark the distance of the Boston Marathon in Smoots, 24.8 KiloSmoots, to be exact.** The MIT Strong marathon team was recognized on stage during a pre-Boston Marathon rally on Friday, April 18th.

**3. The MIT Police and Cambridge Police Joint Honor Guard presented the flags at the ceremony of remembrance for Officer Sean A. Collier held last Friday in MIT's North Court.**

**4. David Mahor, the Mayor of the City of Cambridge, announced last Friday at the ceremony of remembrance that the corner of Main and Vassar Streets shall be designated as "M.I.T. Police Officer Sean A. Collier Square."** A new sign was unveiled at the location shortly after the ceremony concluded.

**5. An MIT Police Officer enjoys the food at the community picnic and MIT Strong marathon rally that occurred after the remembrance ceremony last Friday.**

**6. Elizabeth A. Warren, United States Senator (D-MA), delivered remarks at the ceremony of remembrance of Officer Sean A. Collier last Friday, April 18th in MIT's North Court.**



# Green at MIT

IN YOUR COMMUNITY

## Soaking up the sun for a cross-country drive

The MIT Solar Electric Vehicle Team prepares for the American Solar Challenge

By Kali Xu

CAMPUS LIFE EDITOR

How many MIT students does it take to build a solar-powered car? The MIT Solar Electric Vehicle Team (SEVT), an Edgerton Center-sponsored, student-run group, can do it in two years with just 15-20 students.

Currently, MIT SEVT is working on Valkyrie, a three-wheeled vehicle registered as a motorcycle. Valkyrie is a race

car that seats one passenger, the driver, and can reach a maximum speed of about 80 mph. The total system can run on just 1.2 kW, about the same amount of energy as a hairdryer.

The team is preparing to race in the 2014 American Solar Challenge (from Austin, Texas to St. Paul, Minnesota) in July and the World Solar Challenge in Australia in 2015. These races are held every two years, so the SEVT builds a new car every two years in preparation.

The team iterates on the previous design in order to make the new car. Having finished a year of design work, the team is now in the second year of the build phase.

Building a solar-powered car isn't easy — it requires a lot of labor, as well as money. Julia C. Hsu '14, captain of MIT SEVT, recalls her favorite team experience — working on a composite layup for the exterior shell of the car, which takes 72 hours straight and up to 15 people, over IAP one year. "It was so messy. We were up until 4 a.m. trying to find air bubbles in this one structure, and it took us two hours," Hsu said. "In the end we were like, whatever, we don't really care anymore. I definitely learned that sometimes things don't go as planned. It's OK though, you just have to let it go. It was a good team bonding experience."

As for funding, the team must raise a quarter of a million dollars to build each car. Although the team consists of a diverse group of students from within the science and engineering majors, it lacks business students or a business and marketing subteam. The team finds sponsors and support from many external companies and departments at MIT. They even offer an "adopt a solar cell" sponsorship opportunity for the 391 solar cells powering Valkyrie, which is a popular and easy way to support the team. Hsu said, "Generally we build first and worry about money later, because we're engineering-minded, but we try to be financially conscious."

Once the car is ready, the testing begins. "We start out testing in a random parking lot, and then after that we get our car registered. And then we just drive out in Boston traffic. It's really fun. You should see people's faces when they see the car!" said Hsu. The team also does track testing at Seekonk Speedway, about an hour away from Boston.

**The car has to pass strict inspections to make sure it follows all the race regulations.**

Before competing in a race such as the American Solar Challenge, the car has to pass strict inspections to make sure it follows all the race regulations. This process, called scrutineering, usually disqualifies about half of the teams, so it's no easy hurdle. Next, the teams compete in the Formula Sun Grand Prix (FSGP), a track qualifier race that determines the starting order of the cars. Finally, they compete in the cross-country American Solar Challenge race, which is six or seven days long, with set times for racing each day.

One person, usually someone who has been testing the car regularly, drives the solar car during the race, and the rest of the team rides in lead and chase cars. The same controls are used in the so-

lar car as in a cor- wheel, mechanical. According to Hsu, is it might be a litt

The teams ar their battery pack there are set cheo The MIT team ge in races. Hsu said usually been top th wasn't so hot, bu that won't happe dent about this ye

During the 1 competed in, the speed limit pole. after was the wor had; that momen thought it would finish the race, in we could've done stayed up the enti ing to fix the car, a fully finishing the a really good mor thought we would

Though MIT S primarily for raci commercial use, the does serves as a ing innovation. H think that the tec cells and batterie more efficient b tion would happe see. Technology lot, and it would happen."



JULIA HSU

Rose A. Abramson '14, the SEVT electrical lead, checks Valkyrie's battery pack during Tuesday's track testing.

RESEARCH REPORT

## Redefining sustainability

MIT labs that shape the world

By Davie Rolnick

STAFF COLUMNIST

As part of Earth Week at MIT, we've looked at a few labs that are working to build a brighter and more sustainable future.

### Clean water for everyone

It's easy to take faucets and showers for granted. But one billion people don't have access to clean drinking water at all. That number is rising fast, thanks to climate change and population growth.

According to Course 2 Professor John H. Lienhard, the solution lies in desalination and recycling used water. "The technologies around desalination have advanced steadily over the past two decades, and both costs and energy consumption have fallen sharply," said Lienhard, who is the director of the Center for Clean Water and Clean Energy, a joint venture between MIT and the Saudi institute King Fahd University of Petroleum and Minerals. "It also carries lower environmental impact than many alternatives, such as long distance water transfers that cause rivers to run dry."

The secret to clean water may be inside your pencil. Recent work by David Cohen-Tanugi, a Ph.D. student in Course 3, and his advisor Associate Professor Jeffrey Grossman, shows the promise of desalination filters made of graphene. Graphene is an extremely thin form of the graphite that we use in pencil leads, and it can be made by pulling at graphite with Scotch tape. Only one atom thick, graphene is nevertheless very strong, and it's a natural filter, with holes just large enough to let water through while catching impurities.

One of Lienhard's goals is to produce small, solar-powered devices for water purification. "The rural developing world faces an urgent need for small-scale, locally-powered water purification systems," he said. Lienhard and other MIT researchers also analyze the efficiency of various

methods of purification. These methods include reverse osmosis, which uses a filter such as graphene, and distillation, in which water is boiled and then condensed.

### The air we breathe

What's in the air? Ask an atmospheric chemist. Noelle E. Selin is an assistant professor in MIT's Engineering Systems Division and Course 12. "My research focuses on tracing air pollution from its source to its impacts on human health," she said. "I use computer models to better understand the fate and transport of air pollutants such as mercury, ozone, and atmospheric particulate matter."

**Selin and several students participated in the final negotiations of the Minamata Convention a global mercury treaty.**

Selin works at the interface between research and policy. Last year, she and several students participated in the final negotiations of the Minamata Convention, a global treaty regulating mercury pollution. Selin has also co-written a role-playing game called "The Mercury Game" (available online), intended to teach players about the role of science in policy-making.

While Selin considers effects upon human health, other researchers are exploring the effects of air pollutants on the environment and climate. Chien Wang is a senior research scientist with the MIT Center for Global Change Science, and his group studies aerosols — tiny particles that drift around the atmosphere.

"Particulate matter is a major threat to the environment and to the climate system," said Wang,

citing aerosol-caused changes in visibility, clouds, rainfall, and temperature. Coal-fired power plants produce an aerosol called black carbon, which is like very fine soot. Wang's group has found that black carbon has a major effect on rainfall patterns in the tropics.

Wang's group collaborates with organizations such as the NASA Goddard Space Flight Center and the National Center for Atmospheric Research. Like Selin, Wang relies upon both empirical data and advanced computer models.

### Plasma power

Can scientists solve an energy crisis with fusion reactions like those in stars? That's the mission of the MIT Plasma Science and Fusion Center (PSFC), a collaboration between five departments: physics, nuclear science, materials science, mechanical engineering, and electrical engineering.

Martin J. Greenwald is Associate Director of the PSFC. "Fusion is a form of nuclear power that has tremendous potential advantages," he said. "The source of fuel, deuterium, is essentially unlimited and available everywhere."

What's more, fusion doesn't require dangerous uranium, or produce large amounts of radioactive waste, like standard fission-based nuclear power plants. Unlike oil and coal, it doesn't release any carbon dioxide (the primary cause of global warming). And in contrast to wind and solar power, you can do fusion anytime, anywhere, whether or not the wind is blowing or the sun is shining. In fact, fusion is how the sun shines.

So why isn't everything powered by fusion? "The challenge is the technical difficulty of making it practical and economical," said Greenwald. Industrial fusion is still probably many years down the road, but MIT has built what may be like the power plants of the future — an advanced fusion reactor, or "tokamak," called Alcator C-Mod. The tokamak is like an ultra-powerful microwave, where plasma

is heated to eighty million d toroidal chamber by strong r

Due to federal budget cu C-Mod was shut down durin measure was recently introo kamak operational through to Greenwald, "I believe that are so great that it has been work to."

### Efficient systems

Having power is not enough to use that power effectively it's not being used.

Sometimes it helps to s been able to harness and ma micro and nano scale," said sociate Professor of Mechan example, we have demonstr engineered surfaces to signi transfer for steam power plan

Wang's group, the Device is developing more effective energy through heat. The gr battery that stores heat, usin device could increase the mi by up to thirty percent.

James L. Kirtley, Profess neering, is working on powe cy from another angle. His improve electricity distribut and batteries for renewable e

Edwin F. Fongang G is a fi in Kirtley's lab. He is workin lows power from a solar arr into the electrical grid. The cheaper than those already ing it to be used in smaller-s

"The thing I enjoy most





INTERVIEW

# 70 plastic bottles + 1 artist = 2 trees + 1 hammock

The Tech talks to Matthew Santens, founder of The Elevated Movement

By Angelique Nehmzow  
STAFF WRITER

*Editor's Note: Some parts of this interview were shortened and edited for clarity.*

If you walk down the Esplanade on certain sunny days in the future, you may come across a group of people relaxing in colorful hammocks. These are the creations of Matthew Santens, the founder of The Elevated Movement.

The Elevated Movement is a company that aims to sustainably produce beautiful hammocks. They offer artist-designed hammocks and support independent art by ensuring these artists receive thirty percent of profits. They also provide templates that allow you to custom-design your own hammock. The fabric they use is made from 100 percent recycled plastic, and the amount of energy needed to produce it is less than half that needed to produce virgin synthetic fibers. Moreover, they have partnered with the nonprofit organization Plant With Purpose to plant two trees for every hammock sold — after all, you need two trees to hang a hammock.

The Tech met with Matthew Santens to find out more about his company and how he came to found it.

**The Tech:** Could you tell me a bit about yourself, and how you became interested in hammocks?

**Matthew Santens:** I grew up right outside D.C. and went to college for a semester, but then decided I'd rather be traveling. I spent some time in California and moved to Boston three years ago. Traveling and being outside sparked my interest in hammocks. I started camping in hammocks. If you hang up a hammock and a tarp, you don't need a whole tent, so you don't have to find flat ground or worry about rocks. It's nice — a lot lighter, fun, and more comfortable.

**TT:** How did you get the idea of The Elevated Movement?

**MS:** As with anything, if you start doing something enough, you start to look for ways that you can make it better or make it a part of your life. I was spending a lot of time in hammocks, and I thought that maybe I should try to earn a living from something that I'm passionate about. I wanted to do something creative. I have a friend doing these kinds of designs on shirts, so I saw the technologies available and started doing research into how to use them with hammocks.

That's where the idea of the artist-designed hammocks came from. Soon afterwards, I realized that I was enjoying nature in a product that's hurting nature, because the hammock fabric itself is either nylon or polyester, which are petroleum products. I wanted instead to create a sustainable hammock, and that led me to finding out about companies that make polyester fabrics from plastic bottles.

**TT:** When and how did you start making your idea reality?

**MS:** I'd been thinking about the idea for a while, but I only really started back in mid-August. That's when I sewed my first hammock. I had some savings that I used as initial funding for working on prototypes, and when I was ready to place the first order of ten hammocks, I told friends on Facebook, who ordered them at a price that just covered the costs. They got to test the hammocks out and tell me what they liked and didn't like, and since then I have done a couple more batches with different fabrics. Now I'm running a kickstarter campaign to raise money for the first run of production.

One thing I haven't compromised on is that everything is made in the United States. The printing and sewing facilities are in South Carolina, and

the textile mill is in North Carolina. It's hard to find suppliers that are 100 percent United States. Something that says "Made in the USA" might not be entirely true, because many manufacturers get the materials from overseas and then assemble here, or use materials from here but assemble overseas, because they want to save on cost. There isn't a lot of production happening in the United States that isn't specialized, so getting, for example, the metal pieces made was difficult.

**TT:** How do you print the designs onto the hammocks?

**MS:** We use sublimation dyes. You know how when you wash your face you use hot water because it opens your pores? That's how sublimation dyeing works. You have the dye on a piece of paper, and it gets pressed with heat and pressure, which expands the fibers of the polyester, sublimates the ink (turns it from a solid into a gas), and fuses the ink into the fibers. Unlike screen printing or direct to garment printing, the design can't fade or flake off over time, because the fibers themselves are dyed.

Our printing facility is cool. A lot of issues with dyeing are because the wa-

ter with the dye can be toxic and there is runoff, but this facility has its own water treatment and recycles all its water. They have been using the same water for 20 years, and don't require any new water to be brought in.

painting or tapestry, but you can bring it around with you, so it is a creative way to help artists get exposure, and we found they were receptive to this.

**TT:** Tell me more about the technical design of your hammocks. How big are they and how do you hang them?

**MS:** Our hammocks are 10 feet by 5 feet wide, which is between the standard sizes for single- and double-person hammocks. When you lay in a hammock you lie on the diagonal, like intersecting the major axis of an ellipse, so the longer and the wider the hammock is, the more diagonal you can be, and the more comfortable you're going to be.

There are different methods for hanging hammocks. Normally, they come with heavy carabiners that you have to attach to straps that you put around a tree. I chose a method that would minimize weight while being user-friendly, and I wanted to keep everything attached together. At each end of the hammock a strap is sewn on, which you loop around a tree and secure to itself with a triglide buckle — it's like putting on a belt. The hammock weighs only 10 ounces, and the straps weigh 7.5, so the total weight is just over a pound, which is really light.

**TT:** Where can I get a hammock, and how much does one cost?

**MS:** The hammocks are going to be about \$135, which is right in line with others on the market right now. Our Kickstarter campaign ends at midnight on April 27, and the people who bought a hammock through that will be on a waiting list, and we will be sending out 230 hammocks to them in June, July, and August. After that we will start full production and take orders through the website.

**TT:** Why did you choose to partner with Plant With Purpose?

**MS:** One of the communities I am a part of is the Valhalla Movement, which tries to make sustainable living more mainstream. To me, making hammocks out of recycled prod-

ucts is awesome, but it's not the end. I think we can take a more active role in reshaping our landscape. By recycling and replanting, we could take a landfill and over time bring it down to nothing, while turning it into art and a bunch of hammocks for people to enjoy, and in the place of that landfill there could be a new forest.

Plant With Purpose had by far the best scores out of any environmental nonprofit on Charity Navigator, which is a website that ranks nonprofits against how much of their funding goes to the cause, what their financial transparency is, etc. Plant With Purpose works worldwide, finding places worldwide where there has been deforestation or damage to the waterways, and plants trees in those areas. It's not just about planting trees, but about planting them in a place where the community can benefit over time. For example, planting them by a riverway to prevent erosion creates richer soil that can be used for agriculture.

**TT:** What was your favorite part of this whole process so far? And what was the most challenging part?

**MS:** My favorite part, apart from the first time I saw the hammocks and got to go camping in them, was researching — it's getting to go down the rabbit hole. Knowing there is an answer, but not knowing what that answer is, and then working to find it, is very rewarding and fun. It's been a constant educational journey, learning about different fabrics, methods of sewing, printing processes, and so on. That's also the hardest part — trying to find the right manufacturers, the right suppliers, etc.

It has also been exciting getting to meet some awesome artists, and to hear from others how much they believe in the project. I get at least one message every day from someone I don't know, saying that they support me, and that's just an amazing feeling.

To find out more, go to The Elevated Movement's website at <http://www.theelevatedmovement.com/>.

**The Elevated Movement is a company that aims to sustainably produce hammocks.**



COURTESY OF THE ELEVATED MOVEMENT

Matthew Santens, the founder of The Elevated Movement, uses recycled plastic to make hammocks.



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or of Electrical Engi- r storage and efficien- group studies ways to tion, cooling systems, energy.

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EARTH WEEK

# Making MIT a model of sustainability

An interview with Julie Newman from the Office of Sustainability

By Deena Wang  
ASSOCIATE CAMPUS LIFE EDITOR

The MIT Office of Sustainability sits in a temporary space in the basement of Building 12, a far cry from the stereotypical green and airy spaces that are associated with “eco-friendliness.” Despite these humble surroundings, Dr. Julie Newman, Director of Sustainability since August 2013, is propelling the Office to influence the decision-making of MIT.

Newman has a lot of experience working in research institutions. She started out at the University of New Hampshire, where in 1997, she founded one of the first offices of sustainability in the country, which later became the UNH Sustainability Institute. In 2004, she founded the first Office of Sustainability at Yale. Now at the MIT Office of Sustainability, she says, “In MIT lingo, this is my third startup.”

Newman took care to understand the culture and goals of MIT when she arrived. She spent her first two months at MIT on a “listening tour,” interviewing over 150 people. She talked to a wide range of people, from

faculty to Facilities to student government leaders. She said, “A lot of what I have focused on my first six to eight months is an analysis and assessment of MIT as an institution — how to understand MIT as an Institute in order to situate and build a new Office of Sustainability... that reflects the essence, culture, and mission of MIT.”

One important initiative of the Office of Sustainability is to measure MIT’s resource use. According to Newman, “By this summer, we’ll have at least a first cut at a strong quantitative baseline of our systems, so we understand where we’re starting.”

Newman is also interested in cultivating relationships with the City of Cambridge, as MIT shares with it land, transportation, and a watershed. The Office would like to work “hand-in-hand” with the city on issues important to MIT, such as ecodistricting Kendall Square, and the Net Zero ordinance that would require all new buildings to have “net zero” greenhouse gas emission through a combination of energy-efficient construction, use of renewable energy, and purchase of Renewable Energy Certificates.

MIT still has a long way to go when it

comes to renewable energy. Despite the solar panels on the student center, only a “very tiny percent” of MIT’s total energy use is provided by renewable energy. Newman said, “One of the questions on the table is, ‘How much should it be?’”

## Newman is also interested in cultivating relationships with the City of Cambridge.

One of Newman’s goals is to make MIT a leader in campus sustainability and inspire other institutions to make changes. Although MIT’s resource use is at a much smaller scale than that of an entire city, MIT could become a “scalable model for sustainability.” She said, “I will be able to identify and bring in so-called ‘best practices,’ but that’s only the beginning. What MIT is about is cutting edge.” Since MIT is currently focused on re-

newing the campus and constructing new buildings, Newman wants sustainability to be considered from the start, and not as an afterthought. New construction provides an opportunity to create energy-efficient buildings, manage storm water, consider sources of power for MIT’s energy grid, etc. “We’re making decisions today that will impact students 30, 50 years out, so it’s a phenomenal opportunity for MIT to pave the way for a new way of designing and renewing buildings and infrastructure.”

For students looking to become involved in sustainability initiatives, there are many campus options. There is the MIT Energy Club, the MIT Water Club, the MIT Food and Agriculture Club, as well as a variety of interdisciplinary classes. For students looking for low-committment options, there are also presentations such as the MIT Sustainability Summit held in the Media Lab on May 3-4. In addition, the Office of Sustainability is offering internships this summer. Newman says, “We would very much welcome UROPs supporting some of the analysis we need done, to come up with the solutions that need to be developed.”

GREEN PERSPECTIVES

# Composting at MIT

The benefits of composting for the Institute and beyond

By Jillian Katz and Joshua Hester

Here in Cambridge and at MIT, literally tons of waste are thrown away every day, filling our landfills and generating methane and carbon emissions when they could be generating value for our communities. Recent data from the EPA shows that people in the United States generate on average 4.4 pounds (2 kg) of trash per person every day. Approximately 65 percent of this ends up in a landfill, resulting in 160 million tons added to our landfills — enough to cover the entire area of Cambridge, Massachusetts with over 75 feet of garbage — every year.

But with composting, nature has provided us with a way to not only reduce our production of municipal waste, but also turn it into something useful. Through this natural decomposition process, our nutrient-rich

food waste is turned into soil that can be used to grow more food.

Up to two thirds of American “garbage” is actually food waste. This means that if we separated this organic material and composted it, we could prevent up to 32 million tons of waste from being sent to the landfill every year. In producing more rich, organic soil through compost, we could also reduce the need for artificial fertilizers, which pollute our waterways through runoff. Plus, diverting food from landfills can mitigate the methane emissions that result from anaerobic decomposition (landfills are the source of 20 percent of US methane emissions).

Composting allows us to prevent unnecessary landfill growth, make rich soil, and slow global warming all at the same time. Fortunately, MIT started a composting program several years ago, and all you need to

do is pay attention to where you throw your waste. If it’s any type of food — cooked or raw, meat or vegetarian — or packaging clearly marked as compostable, then put it in the compost bins! And remind your friends not to throw trash into the compost, because if there’s too much non-compostable material mixed in, a whole bin’s worth will have to be sent to a landfill.

There are currently many places on campus where composting is an option. There are compost bins next to the trash and recycling bins at Lobdell, Stata Center, Koch Café, Edgerton Center, and Sloan, as well as all along the Infinite Corridor. In addition, all Bon Appetit kitchens have been composting their pre-consumer waste, and as of the beginning of this semester, those eating in the dining halls also have the option to compost what’s left on their plates. Most of

the dorms (both graduate and undergraduate) either have composting collection for residents or are starting pilot programs this spring.

If you live in one of the dorms where there is already compost collection, then get in touch with your dorm’s environmental or sustainability officer to find out how to participate. If you would like to help raise awareness about composting and spread compost collection to other places on campus, please contact Composters@MIT ([composters@mit.edu](mailto:composters@mit.edu)) or the UA Committee on Sustainability ([ua-sustainability-chairs@mit.edu](mailto:ua-sustainability-chairs@mit.edu)).

*Jillian S. Katz ’16 is a member of Composters@MIT, and Joshua C. Hester G is a member of the GSC Sustainability Committee, the MIT Sustainability Club, and Composters@MIT.*

RESEARCH REPORT

# MIT labs study green tech, impacts

Energy, water, climate, and air among many research focuses

Naturalist, from Page 10

eclectic learning experience,” Fongang said. “It involves knowledge in areas such as power electronics, modeling and control, circuit design and layout, power systems, and programming.” In addition, he says the project has the potential to improve renewable energy systems. “Working to achieve this has a good feeling to it.”

## Modeling the Earth

Imagine the world. Now add to your picture: economies, societies, and the environment. What will everything be like in the future?

Enter the MIT Joint Program on the Science and Policy of Global Change. It’s a collaboration between the School of Science, School of Engineering, Sloan School of Management, Economics Department, and MIT Energy Initiative. Its goal is to understand how the Earth is changing and what we can do to shape that change.

“The Joint Program uniquely brings together scientists and economists who work hand-in-hand to confront the environmental, economic, and social

challenges of global change,” said Victoria M. Ekstrom, Communications Officer for the Center for Global Change Science. She said the program addresses “climate change, but also population growth, increasing food/water/energy demands.”

The foundation of the Joint Program is the MIT Integrated Global System Modeling framework (IGSM). This is an intricate system of computer models that tie together climate patterns, ecology, and human society. How are food prices tied to weather patterns? Can we balance effective climate change policy against cost? In what ways is the ocean changing, and which areas will be impacted the most? To answer these complex questions requires collaboration across many fields.

“The Joint Program is internationally known for its IGSM model, having been one of the first to integrate the human and earth systems in such a comprehensive fashion,” said Ekstrom. “It strives to be a clearinghouse for research at the Institute and beyond.” What will the future be like? If anyone can answer, it might be MIT.





BEE MUSING

# On honeybees

Be aware of the environment you live in

By Ethan Sherbondy

Walk along the Charles today, and you'll find that spring is in full swing. The crocuses and daffodils are blooming. The geese are back in town. And if you stand still for a bit and watch the flowers, you may encounter a few pollinating insects buzzing along.

*Apis mellifera*, the European honeybee, is one such pollinator. Honeybees are not native to Boston, but these creatures have increasingly found homes in urban areas, as residents of cities around the world reconsider the kind of ecological company they keep.

In my final year as an undergraduate, I have decided to start keeping bees at my living group as a bizarre sort of parting gift. This week, pika (one of MIT's six independent living groups) will welcome its first colony onto our property in Cambridgeport. The colony should be a snug fit for our yard, which is already an eclectic nesting ground for an assortment of critters. The hive will join the ranks of our half-dozen chickens, two cats, and modest garden.

I hope that members of the MIT community come visit to observe and learn from them, because the honeybee serves as a powerful re-

minder of the network of causality which has brought us into the present. Flowering plants, pollinating insects, and mammals all co-evolved together over the past few hundred million years.

Honeybees teach us that relatively simple agents, operating socially, can yield intricate, startling aggregate behaviors. Even during the harsh northeast winters (hopefully a distant, fading memory in your mind), a hive maintains a constant temperature of around 96 degrees Fahrenheit at its core. Via dancing, bees manage to communicate to each other the

**Honeybees teach us that relatively simple agents, operating socially, can yield intricate aggregate behaviors.**

precise location of flowers for forage, which may be upwards of four miles away. And they somehow collectively compose homes out of wax secreted from their abdo-

mens and arranged in hexagonal chambers.

Many beekeepers have characterized hives as living, breathing research labs-in-a-box. As scientists examine these creatures and seek to understand them — both at an individual level and as systems — we gain continual insight into ecological connections, social behavior. We also see how much we have left to learn about chemistry, epigenetic regulation, and topology, among many other fields.

Today our agricultural system is heavily dependent on the honeybee and its fellow pollinators. The USDA estimates that honeybees alone contribute to \$15 billion in crop value each year. California's almond crop (80 percent of the world's almonds), for instance, is pollinated almost exclusively by honeybees. Unfortunately, the future of managed beehives is at risk.

We don't know if pika's hive will survive its first winter. When humanity started engaging in migratory beekeeping practices a few decades ago, it appears that we unintentionally helped the bacteria, viruses, and parasitic mites which kill bees to rapidly spread throughout the majority of the honeybee population.

A lot of the man-made issues I have noticed in my short time on

Earth seem to stem from our ongoing model of capitalism and mass production, which has encouraged the homogenization of a formerly diverse system in order to manufacture goods and services while potentially undermining the system itself.

**I hope we use our technical expertise to cultivate the further discovery and understanding of life on Earth.**

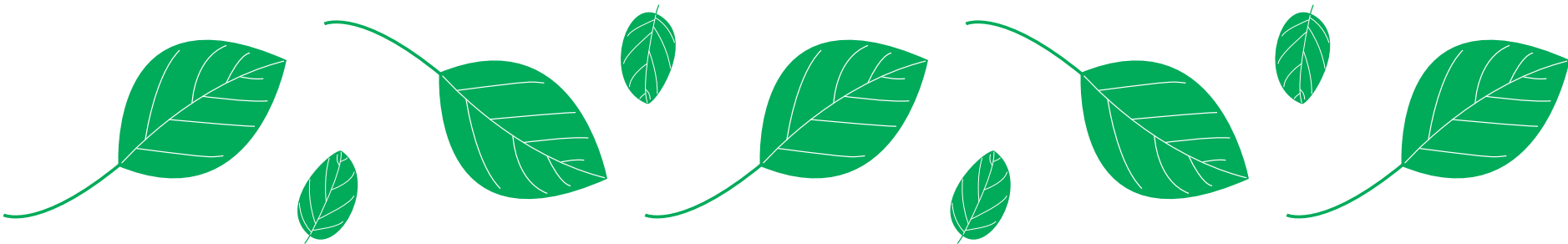
While our Institute triumphantly proclaims that technology is a key facet to improving the livelihood of the world and decreasing human suffering, I am more hesitant to agree. I respect how far our species has come in such a short time, but I am also disturbed by how powerful tools have allowed us to walk very quickly without having the slightest clue what we are even pacing toward. The implications of this so-called Anthropocene perplex me to no end.

In the past few years, I have begun to view humanity as a super-

organism. Honeybees and other social insects, while distinct from us in so many regards, have nonetheless been a useful model for understanding aggregate entities. They demonstrate that certain individual-level behaviors, while seemingly irrational or even destructive when viewed at the level of solitary agents, may actually contribute to the survival of the organism when viewed as a collective.

I hope that we use our technical expertise to cultivate the further discovery and understanding of life and other phenomena on Earth; to study these creatures and continue to piece together the nature of the causal web which constitutes the present. I hope that our capacity to build tools to expand the mind and eyes manages to outgrow our drive to build tools to expand the hands. *Mens et manus.*

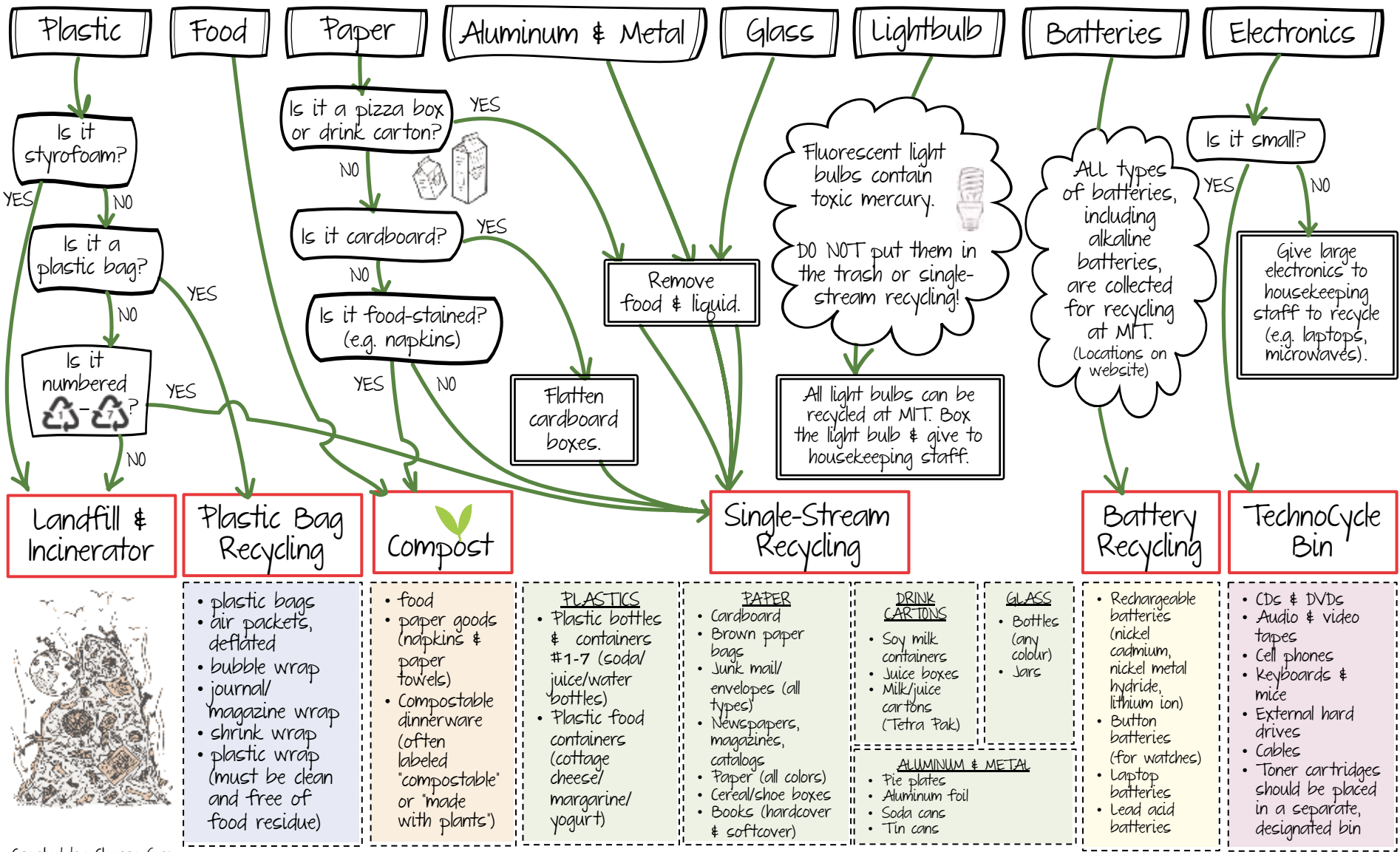
If you have thoughts pertaining to the current state of affairs with bees, or the agricultural system at large, or how technology may play a role in undoing some of the unexpected life-threatening side effects of our present situation on Earth, I would love to hear from you. Come to pika on a sunny day sometime, and witness the flow and rhythm of the bees.



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# Prof. unveils design of planned permanent Collier memorial

Chief DiFava: MIT Police ‘impressed beyond words’

Sean Collier, from Page 1

“The symbolism of the open hand resonates on many levels,” said Yoon. “The hand is a gesture of openness and generosity; it is also the alternative to a closed fist and a symbol of peace, and at MIT the hand has a special meaning as the complement to the mind and the symbol for applied knowledge.”

The memorial will be located between the Stata Center (Building 32) and the Koch Institute for Integrative Cancer Research (Building 76), near where Collier was shot in his vehicle while on duty. Shortly after his death last year, a makeshift memorial was erected in the area.

MIT Police Chief John DiFava, the co-chair of the Sean Collier Permanent Memorial Committee,

called the new permanent memorial “a continuation of the most incredible support one can imagine,” both for Sean Collier and for the police department. He said that the MIT Police were “impressed beyond words” with the design.

According to an email from MIT Executive Vice President and Treasurer Israel Ruiz SM ’01 last fall, the memorial committee was convened over the summer. Committee members include Provost Martin A. Schmidt PhD ’88 and students Sally A. Miller ’16 and Sara E. Ferry G. DiFava said that the committee selected the architect and categorized the data they received after they sent an email to the community soliciting input.

Several details of the project’s implementation have not yet been finalized.

“Right now, there are several different funding sources but [the funding of the memorial] hasn’t been completely worked out,” said DiFava. He mentioned that there have been many donors, including those who gave to the Sean Collier

Memorial Fund.

“The reason why it’s difficult at this point to come up with a cost is because of the stone,” explained DiFava. “Is it already in the quarry? Does it have to be cut from the quarry? Are there pieces left over from some other job that we can use? These are all the questions that have to be answered, so before we can come up with actual prices, there’s an awful lot of work has to be done.”

In addition to the remembrance ceremony last Friday morning, MIT also held a community picnic in the afternoon to help rally for the 40-member MIT Strong marathon team, which raced in Monday’s Boston Marathon.

On the same day as the ceremony, a group of hackers called “Cranes for Collier” suspended thousands of white paper cranes beneath a skylight in the Stata Center as a tribute to Collier. According to the group’s website, the MIT administration has decided to leave the crane installation up indefinitely.

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A dancing ankle prosthesis



HO YIN AU—THE TECH  
Associate Professor Hugh Herr from the Biomechatronics group at MIT's Media Lab demonstrated his research into bionic limbs to the press on Friday, April 18. His research restored Adrienne Haslet-Davis's ability to dance after she lost her left leg following the Boston Marathon bombings that occurred in April 2013.

**Saturday Stumper**  
from page 7

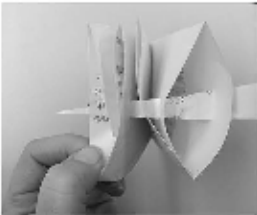
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G	A	W	A	I	N	M	A	N	I	P	E	D	I
S	N	A	R	E	S	U	P	G	R	A	D	E	S

**Four-H Club**  
from page 6

B	E	T	O	N	G	E	R	M	A	T	M	S		
E	C	O	N	O	I	D	E	A	S	H	A	H		
T	H	R	U	S	T	F	U	N	D	T	R	U	E	
H	O	T	S	E	A	T	D	E	P	R	A	V	E	
			O	R	S	O	L	O	S	E	R			
L	E	T	S	U	P	P	O	T	A	S	H			
E	L	I	O	T	S	P	O	O	N	T	I	N		
G	A	R	Y	W	O	O	Z	Y	B	A	S	E		
O	L	E	R	I	N	S	E	E	U	L	E	R		
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A	C	H	E	D	S	L	U	G						
C	O	R	N	E	A	S	A	S	H	C	A	N	S	
H	U	E	D	S	T	A	T	E	T	H	R	E	E	
O	L	A	Y	K	A	N	E	H	E	I	S	T		
O	D	D	S	S	T	Y	X	S	W	A	T	S		



PRESERVATION WEEK  
April 29–May 1, 2014



**Tuesday, April 29, starting at 12pm**  
*The Art and Science of Document Security: Past, Present, and Future*, 32-144  
A series of talks on creating secure documents in all forms. Join us for one session or several. Breaks for refreshments and questions throughout.



- 12:15 pm *"Our Marathon": The Boston Bombing Digital Archive*  
Jim McGrath and Alicia Peaker from *Our Marathon* give an overview of the project and archive.
- 1:00 pm **Opening Remarks**
- 1:15 pm *Our Digital Lives: Protecting Our Data In Use and At Rest*, Michael Halsall, MIT Senior Network and Information Security Analyst
- 1:45 pm *Benign Neglect No More: How Document Security Affects Access to Memory*, Kari R. Smith, Digital Archivist, MIT Libraries
- 2:45 pm *Historic Letterlocking: The Art and Security of Letterwriting*, Jana Dambrogio, Thomas F. Peterson (1957) Conservator, MIT Libraries
- 4:00 pm *Thanks for the Memory: 50+ Years of Computing at MIT* exhibit, 14N-130 Gallery visit led by Nora Murphy, Archivist for Reference, Outreach, and Instruction, MIT Libraries
- 8:00 pm *Monuments Men* Movie Screening, 26-100 Free screening of *The Monuments Men*, based on the true story of local art conservation hero George Stout who saved cultural heritage from ruin during WWII.



**Wednesday, April 30, 11am-3pm**  
*Our Marathon "Share Your Story" event*, 10-105  
Representatives from *Our Marathon* will be on campus to document the personal experiences of the MIT community during and after the 2013 Boston Marathon Bombing.



**Thursday, May 1, 2-3pm**  
*Scrapbook preservation webinar*, 14N-132  
A webinar about scrapbook preservation by Melissa Tedone, Conservator of the Parks Library Preservation Department

All events are free and open to the MIT Community.  
To learn more, see: [bit.ly/preservation-week](http://bit.ly/preservation-week)



**Maseeh Sushi Study Break**  
Tuesday 4.22 | 9-10 pm  
Maseeh PDR

Enjoy free sushi and speak with our helpful members, who will be on hand to talk about and answer any and all questions you might have about HBV!

**Boba with Dr. Howard Heller**  
Friday 4.25 | 3-5 pm  
Student Center PDRs 1 and 2

Dr. Howard Heller is a physician with MIT Medical with a specialty in infectious diseases. He will give a presentation during which you can check your immunization status!  
BOBA TEA WILL BE SERVED.

**TeamHBV Booth**  
Friday 4.25 | 9am-5pm  
Student Center

Our booth in the student center will offer free HBV risk assessment surveys, as well as free snacks. Drop by if you have any questions or concerns about HBV!

**Freshman Panel**  
Saturday 4.26 | 2-3 pm  
5-233

If you're curious about exploring a career in the health sciences, come to our panel geared toward freshmen. We will have undergrads in various stages of the med school application process to answer all your questions!

#joinjade



4.20 ~ 4.27 is:  
**Hepatitis B virus Awareness Week**



# Shuttle sees robust ridership

## Somerville numbers comparable to Cambridge East

Saferide, from Page 1

suaaded MIT to run a pilot program. The Somerville Saferide Shuttle pilot program operated throughout Fall 2013. This program brought a

new Saferide route to graduate students living in Somerville and East Cambridge, where neither the MBTA nor MIT Shuttle System services operate on weekdays after 7 p.m. or on weekends.

According to the report, the Somerville Saferide Shuttle pilot program attracted a large ridership — similar to the Boston West and Cambridge East shuttles — and in December it was still increasing, as service improved and awareness

spread. The ridership was more evenly distributed along the route than for most other shuttle routes, which suggests most stops were amply used.

The report recommends continuing the Somerville Saferide Shuttle on a permanent basis. The MIT Parking and Transportation Committee will vote on the recommendation at their next meeting.

“We can do data-driven redesigns for all the bus lines,” Spatocco added, “We should treat MIT like a living lab, where students get real hands-on knowledge by doing, not by reading, and make real impact.”

Details of the report can be found at <http://gsc.mit.edu/2014/04/somerville-saferide-shuttle-assessment/>.

Phi Sigma Kappa, from Page 1

house after 10 p.m. during CPW events, and the same restriction will extend to Rush, according to Tencer. The fraternity was also responsible for providing more members to serve as alcohol inspectors during CPW, and this requirement will also apply to Rush.

During Rush and CPW, “There can be no alcohol, alcoholic containers or suggestion of alcohol consumption on the premises of any chapter or living area of a member of the IFC,” according to the IFC’s 2013 recruitment rules. Each fraternity is inspected by two non-members in an effort to enforce this rule. Tencer wrote in an email to *The Tech* that Phi Sig must now provide one of the two students for the inspection of every other fraternity.

Ryan M. Lau ’15, a member of Phi Sig and the current JudComm chair, recused himself from the case involving the second hearing.

Changes to JudComm’s bylaws, including the selection of members of a hearing, went into effect Jan. 1. Tencer said that the new bylaws did not apply to the second hearing, but Lau’s recusal would be required under both new and old bylaws.

Tencer affirmed that so long as Phi Sig does not continue failing its alcohol inspections, “some students currently in the fraternity will be able to host registered parties in the future.”

Anil said that to his knowledge, there are now no pending JudComm cases involving Phi Sig.

—Patricia Z. Dominguez with Austin Hess contributing reporting

## MIT Press Bookstore’s LOADING DOCK SALE of the DECADE!

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### Solution to Techdoku I

from page 6

5	4	1	6	2	3
6	5	2	1	3	4
3	2	5	4	6	1
2	1	4	3	5	6
1	6	3	2	4	5
4	3	6	5	1	2

### Solution to Techdoku II

from page 6

3	4	5	1	6	2
4	5	6	2	1	3
6	1	2	4	3	5
5	6	1	3	2	4
1	2	3	5	4	6
2	3	4	6	5	1

### Solution to Sudoku I

from page 6

7	5	3	6	8	4	9	2	1
8	9	2	5	7	1	4	3	6
4	6	1	9	2	3	8	5	7
5	3	4	1	6	7	2	8	9
6	7	9	2	3	8	1	4	5
2	1	8	4	5	9	6	7	3
3	4	6	8	9	5	7	1	2
1	2	5	7	4	6	3	9	8
9	8	7	3	1	2	5	6	4

### Solution to Sudoku II

from page 6

6	1	4	7	2	9	3	8	5
9	3	2	6	5	8	1	7	4
7	5	8	1	4	3	9	2	6
8	2	3	4	1	6	5	9	7
1	9	7	5	3	2	4	6	8
5	4	6	8	9	7	2	1	3
4	6	1	9	7	5	8	3	2
3	7	5	2	8	1	6	4	9
2	8	9	3	6	4	7	5	1



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**\*The Army Lab provides the intern's salary, which typically ranges from \$2280/month to \$2864/month depending on class year. Under certain circumstances the ISN can provide the intern with a supplement of up to \$1500 to defray costs of local accommodations and travel.**

MOVIE REVIEW

# *The Other Woman* retreads familiar comic ground

Weak, disjoint story fails likable, talented leads

By Aleksandra Stankovic

Cameron Diaz stars in the new comedy *The Other Woman* as Carly, a no-nonsense, successful Manhattan lawyer. We know she is successful because both her apartment and corner office feature floor-to-ceiling windows showcasing spectacular, geographically implausible views. Also, she has pretty shoes. Carly is dating a seemingly perfect guy named Mark. He is perfect, the film tells us, because he has great hair, sometimes sends flowers, and has what looks to be a very expensive watch (and no apparent need for a day job). Carly's nicely ordered life is overturned, however, when she unexpectedly discovers that Mark is actually married, and, even more unexpectedly, strikes up a friendship with his wife Kate (Leslie Mann) and his other mistress Amber (Kate Upton).

Naturally, the women bond over plotting to take down the man who wronged them all. This is not a new concept (in fact the sisterhood-of-the-traveling-revenge-pact is something of it's own cinematic subgenre — see *Thelma and Louise*, *Nine to Five*, and *The First Wives Club*). Actually, I'm pretty sure I saw this exact movie before, back when it was called *John Tucker Must Die*, and, you know, it was set in a high school.

Which, incidentally, is exactly where this kind of a movie belongs. Don't get me wrong — I'm all for broadly comedic female-centered revenge-fantasies, and

even for the occasional girls-can-play-as-dirty-as-the-boys bawdy raunch-fests like *Bridesmaids*. It's just that talented actresses like Diaz and Mann, and I suspect Upton as well, deserve better than this, and it's a little hard to watch them portray adult characters who run around New York doing such outrageously juvenile things.

The film has its moments, and I genuinely did laugh out loud once or twice, but that's really a testament to the comedic timing of the two lead actresses and not really a credit to the film itself.

***The Other Woman* is not just a bad comedy — a designation that varies with taste. It's an irresponsible movie.**

Cameron Diaz and Leslie Mann prove themselves, once again, to be skillful and very appealing comediennes. Mann's zany energy and pleading neediness wonderfully temper Diaz's coolness and tough pretty-girl edge, and both actresses showcase their talent by playing so well off one another. Kate Upton is actually adorable in her ditzzy bit. Also, Nicki Minaj shows up as Carly's sassy assistant! And she's funny! But the movie, sadly, fails to meet any of these talented ladies on a level that's worthy of their talents.

Director Nick Cassavetes (*The Note-*

*book, My Sister's Keeper*) keeps the pace moving, but the disjoint editing does the film no favors, and the tonal shifts are confusing. It's hard to buy Kate's insane take-down antics and simultaneously accept her as a thinking, feeling human being experiencing the deep pain of watching her seemingly happy marriage fall apart, but the film futilely asks you to buy it anyway.

If you have any intention of thinking about this film for a minute longer than it takes you to finish your popcorn and soda combo, then things will start to turn darker for you, as the film's disturbing subtext comes into focus. The major offense of a movie like *The Other Woman* is not that it's a bad comedy — a designation subject to varying tastes. It's that this is fundamentally an irresponsible movie.

It pretends to be making a point about the self-reliance of modern, city-dwelling women who can be just as fulfilled without a romantic partner, and yet it completely reinforces the values its so gleefully purports to subvert. Carly is smart and independent, and yet she's not whole until she learns to embrace the traditional dimensions of femininity as represented by Kate's nurturing domesticity and Amber's sensuousness. Only when the three come together do they become the 'perfect' woman and (spoiler alert), finally find their happily-ever-after.

Worse yet, any possible solidarity among the women is only constituted when they have a mutual man-enemy to fight, and not some other kind of common

★★★★☆

***The Other Woman***

**Directed by Nick Cassavetes**

**Starring Cameron Diaz, Leslie Mann, Kate Upton, and Nikolaj Coster-Waldau**

**Rated PG-13**

**Now Playing**

goal to work toward together. Speaking of which, the extent of their collective take-down of Mark is so extreme that it deprives the viewer of the opportunity to even mildly share in the enjoyment of his comeuppance — it's not enough for Mark to be humiliated and mocked, or simply called out as a cheater, which the audience could have gotten on board with as fair play. Instead, the film insists on physically breaking him down beyond the point of all reason, going so far as to become downright uncomfortable.

But then on the other hand, if you set out to watch *The Other Woman* as a silly slapstick, girl-power comedy — which is an equally valid approach — then that's what you're going to get, nothing more and nothing less.



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def learnMarketableJobSkills():
    return linux, OSX, javascript, applescript, perl, python, PHP

if self.interest == True:
    print "E-mail join@tech.mit.edu"

----:----F1 joinTechno.py (Python)--L1--Top-----
```







**By Phil Hess**  
*DAPER STAFF*

Julia C. Hsu '14 took the first singles match for MIT,

**The Engineers clinched the match by taking all six singles contests.**

MIT will wrap up its regular season on Friday when the Engineers will host Simmons College at 4:00 p.m.

**By Maria Alexis**  
*TEAM REPRESENTATIVE*

For Championship sparring, the black belts encountered even tougher competition. Fenta, Chen, Lozoya, Dan Stallworth '14, and one other MIT member all reached the quarterfinals in their divisions, just one match shy of the medals round. They subsequently faced some very

Color belt sparring saw some strong, impressive performances. Shapagat won silver in welterweight red belt sparring. Kevin and Tahin F. Syed G made it to the quarterfinals in a large featherweight red belt division. The red belt females earned three more medals in sparring, with Tiffany and Jessica J. Yang '15 winning silver and bronze respec-

Overall, the team showed great attitude and determination in a large and competitive Nationals and had some really great accomplishments in both poomsae and sparring. Despite their reduced team size, MIT placed third overall, behind Brown and Berkeley. Club members will take these experiences with them as they prepare for the last tournament of the semester at the University of Vermont on April 27.



**Michelle W. Chen '14 competes in a taekwondo match against University of Iowa** at the National Collegiate Taekwondo Association (NCTA) Championships on April 5.

\*Try Out Rugby Anytime: Practice MWF 5-7 pm on Briggs